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METEOROLOGY AT THE BRITISH ASSOCIATION.

IN the Report of the Council of the British Association, presented to the General Committee at Cape Town on August 15th, the following important statement occurs :—

The following Resolution, from the Committee of Section A, having been referred to a Committee consisting of Dr. A. Buchan, Dr. H. R. Mill, Dr. Shaw, and the General Officers, to consider and report thereon to the Council :—

The Committee of Section A desire to draw the attention of the Committee of Recommendations to the concluding portion of Sir John Eliot's Introductory Address to the Sub-Section for Astronomy and Cosmical Physics, and to express the opinion that the organisation of a Central Meteorological Department for the British Empire would be of the highest benefit to the progress of Meteorological Science and its application to the economic problems of the various Colonies and Dependencies. The object of each department would be to collect and prepare digests of the Meteorological observations taken in different parts of the Empire, to provide a scientific staff for dealing with the more general Meteorological problems, including their relations to Solar Physics and Terrestrial Magnetism, which involve the co-ordination of data from wide areas, and to promote experimental investigations of the scientific questions which arise in connection with such discoveries. The Committee desire also to express the opinion that the reorganisation of the Meteorological Office, which is at present before the Government, affords an exceptionally favourable opportunity for the establishment of such a Central Meteorological Department for the Empire.

The Memorandum that follows was drawn up by the Committee and has been approved by the Council :—

Memorandum on a Proposal for dealing with Meteorological Questions affecting the British Dominions beyond the Seas.

There is at present no provision for the systematic treatment of the meteorology of the British Dominions.

Observations of various kinds are made in nearly all the British Colonies and Dependencies, and summaries of these observations are generally included in the respective official publications. India, Ceylon, Canada, the several States of Australia, New Zealand, Mauritius, the Cape of Good Hope, and

the Transvaal have organised meteorological establishments and issue regular meteorological publications. Information with regard to the meteorology of the Crown Colonies and Protectorates is to be found in the Blue-books of the several dominions.

There is no provision for the co-ordination of the methods of observing, the instruments employed, or the presentation of results.

In 1890 the Meteorological Council published a volume of summaries of Colonial observations of the Army Medical Department and of the Royal Engineers, and recently they have published a volume of tables for tropical Africa, compiled by Mr. E. G. Ravenstein from observations practically initiated by a Committee of the British Association.

Colonial observations are sent to the Meteorological Office in accordance with a circular despatch of Mr. Chamberlain.

At the request of the Crown Agents, the Meteorological Council have recently undertaken the supervision of the supply of instruments for the Governments of the Crown Colonies. In their annual reports they have from time to time referred to the desirability of the compilation and regular issue of the results, but they have been unable to make provision for this service.

The want of a satisfactory system of co-ordinating the observations from the several dominions is to be deplored from two points of view—the economic and the scientific.

From the economic point of view, it is eminently desirable that facilities should be given for the comparison of the climatic features of the regions available for settlement and the conditions which affect various industries. At present it is possible to obtain a certain amount of information for an individual Colony by reference to Colonial Blue-books, but the data are of very different orders of completeness; and to ascertain in which Colonies specified climatic conditions are to be found would be a labour of such difficulty as to be practically prohibitive. The Board of Trade publish a certain number of tables of meteorological results among their Colonial statistics, but something of a more comprehensive character is required.

From the scientific point of view the regular issue of the meteorological data for the British Colonies in a published and easily accessible form is urgently desired by meteorologists of all countries. This is sufficiently shown by the following extract from a notice of the recent publication of the results for tropical Africa in the *Meteorologische Zeitschrift*, the leading meteorological journal :—

'To the Meteorological Council the warmest thanks of all meteorologists are due for their resolution to publish from time to time the reports of observations at colonial or foreign stations, which are collected in the Meteorological Office partly in printed form and partly in manuscript. In this journal we have repeatedly pointed out that it is in the highest degree desirable that the rich store of observations which have accumulated in the Meteorological Office, and which might be of great importance for the physics of the atmosphere as a whole, should be made generally known and available. . . . It is very desirable that this valuable publication may soon be continued.'

But there is another aspect from which the scientific treatment of meteorological data must be regarded as having an important bearing upon the economic interests of remote parts of the Empire.

Sir John Eliot, in his address to the British Association meeting at Cambridge, pointed out how the study of the meteorological conditions of the Indian Ocean and the bordering countries had been already applied to problems affecting the economic conditions of India as depending upon the variation of the monsoon rainfall, and he gave reasons for believing that the further prosecution of the inquiry promises valuable results for India, Australia, South and East Africa, and other countries bordering on the Indian Ocean if provision were made for dealing with the meteorological problem in a comprehensive manner with reference to the Indian Ocean as a whole.

Similar reasoning may be held to apply also to other oceanic areas, in or on the border of which British Colonies are situated. In this connection it should, perhaps, be mentioned that the control of the meteorological organisation of the British West Indies is already passing into the hands of the United States.

As a result of Sir John Eliot's representation, the attention of the Council of the British Association has been called to the advantages likely to accrue from the organised study of the meteorological problems affecting various groups of British dominions.

It has been further pointed out that such organised study can be most effectively secured by the establishment of a central institution devoted to these objects. Such an institution ought to be in close connection with the Meteorological Office, which is itself in regular correspondence with the meteorological organisations of foreign countries as well as those of the self-governing Colonies. The meteorology of the ocean has been an essential part of the work of the office from its establishment in 1854, and oceanic data must necessarily be appealed to for the effective study of the meteorology of the neighbouring land areas.

The President and Council of the British Association are informed that the Meteorological Office, as at present constituted, has not the means of dealing effectively with the various problems of colonial meteorology, and the suggested institution would have to be a distinct department with separate provision, whether it was in organic connection with the Office or not.

The President and Council believe that the Government of India, from their interest in meteorological investigations, would be willing to contribute their fair share towards the maintenance of such an institution, and they desire to bring the matter to the notice of the Secretary of State for the Colonies with the view of ascertaining the opinion of the various Colonies which are interested in the subject. They desire to learn whether they would be supported in an effort to obtain the establishment of such an institution as had been described.

By way of summary, the objects of the suggested institution may be briefly stated to be :—

1. To give any information that may be required to the Governments or other authorities of the British dominions as to instruments and methods to be adopted for an effective system of meteorological observations.

2. To compile and publish periodical reports upon the climatic conditions of the various parts of the Empire upon a comparable plan. To form an accessible depository of information upon matters concerning the climates of the whole Empire, and to afford information upon those subjects to inquirers.

3. To provide a scientific staff for the study of the general meteorological conditions which affect the weather in the various British dominions, and in particular to promote the formulation of meteorological laws, and to apply them to explain and ultimately to anticipate the occurrences of abnormal seasons.

A copy of this Memorandum having been forwarded to the Colonial Office, with a covering letter suggesting that the question might be moved by a deputation to the Secretary of State, Mr. Lyttelton replied that, whilst sympathising with the object which the Council had in view, he did not think that there would be any advantage in receiving a deputation until he was in possession of further information on the subject. In satisfaction of this request, the Committee drafted the following additional information :—

Draft Memorandum in further explanation of the proposal for dealing with the Meteorology of the Colonies and Dependencies, for the information of the Secretary of State.

This memorandum deals mainly with the object numbered 3 in the concluding summary of the memorandum approved by the President and Council on March 3, 1905, because the services indicated under numbers 1 and 2 would be included incidentally in the development of number 3.

The statement of the object numbered 3 is as follows :—

To provide a scientific staff for the study of the general meteorological conditions which affect the weather in the several British dominions, and in particular to promote the formulation of meteorological laws, and to apply them to explain and ultimately to anticipate the occurrence of abnormal seasons.

The idea underlying the proposal is to deal with the general meteorological conditions of wider areas than those with which the various meteorological offices of the world have hitherto been regarded as being primarily concerned. The British Meteorological Office does indeed concern itself with the meteorology of the oceans from the point of view of shipping. In effect, the proposal is to utilise further the information already obtained at sea in conjunction with land observations for the investigation of the meteorology of large ocean areas in relation to that of the adjacent land areas, and from the point of view of the land population.

It is known, for example, that the meteorological conditions of India, Australia, South Africa, East Africa, and Egypt stand in close relation to those of the Indian Ocean, and the study of these relations promises very important results in connection with the prediction of the seasons. This investigation requires that the information shall be treated in a manner different from that now followed for the more immediate purpose of its application to the interests of shipping.

The meteorological phenomena which are regarded as demanding careful study, in the first instance, are the following :—

The conditions of favourable and unfavourable seasons in India.
The droughts of Australia and South Africa.
The conditions of favourable and unfavourable Nile floods.

With those would be associated the relation of the weather of the Mediter-

ranean to the Indian cold weather anomalies, and the relation of the South Indian anticyclone to the Antarctic ice.

The larger part of the necessary land data for the investigation of these particular questions can probably be found in the publications of the meteorological organisations of India, Australia, South and East Africa, Egypt, Mauritius, Hong Kong, Singapore, or can be furnished directly by those organisations. They should be supplemented by observations contributed by certain foreign Governments. The marine data would have to be compiled from the documents collected from ships by the meteorological departments of this country and India. The further development of the collection of observations — more especially of marine data — might be necessary, in order to complete the investigation.

The use of the data would be, in the first instance, to obtain a survey of the sequence of the more general weather changes over the whole region under consideration. The first step in the operations, therefore, would be to consider the nature and extent of the data available for the purposes in view, and the form in which they should be compiled for study or for publication.

A corresponding enquiry for the Atlantic Ocean and the countries bordering upon it is equally desirable, and should be conducted concurrently in the interests of the British Isles, and the American and West Indian Colonies.

In order to carry out the proposal, something more than what would be generally understood by "a moderate addition to the staff of the Meteorological Office" is required. The proposal involves a scientific investigation of a very important character, which could not be regarded as merely an incidental addition to the usual operations of the Office. A man of suitable scientific attainments should be responsible for conducting it in consultation with, and under the general supervision of, the Director of the Meteorological Office. It is desirable to mark the nature of the qualifications expected in the person to whom the work is entrusted by giving him the title of Assistant Director, and providing a salary of from £400 to £600 a year. It should be remembered also that the Meteorological Office could not find accommodation for the proposed additional staff without some addition to the space at present available.

It is estimated that the annual cost of the work would be £2,000, rising in five years to £2,500, made up as follows :—

SALARIES:	Assistant Director	£450 to £550
	Scientific assistant, computers and clerical staff	£1,050 to £1,300
PUBLICATIONS, printing and stationery	...	£300 to £500
INCIDENTAL EXPENSES, office rent, &c.	...	£200 to £150

The estimate is based on the supposition that the Meteorological Committee would be willing to undertake the general control of the department as a branch of the Meteorological Office.

It may be mentioned that the Government grant to the Meteorological Office at present stands at £15,300. The cost of the marine department, as shown in the Report of the Meteorological Council for 1903-4, is £1,366, exclusive of office expenses, publications, &c.

The Council, in approving this Memorandum, has caused it to be conveyed under a covering letter to the Secretary of State for the Colonies.

ON THE USE OF BEAUFORT'S SCALE.

By R. H. Curtis.

Meteorologists who have not had much to do with wind observations, would probably be surprised to find how many and how varied are the scales employed for the estimation of wind-force in various countries, and even in different parts of the same country, and their surprise would scarcely be lessened to learn upon what an arbitrary and unsatisfactory basis many of these scales have been constructed.

A very slight consideration of the matter would suffice to show that it must always be difficult, and in many cases perhaps impossible, to satisfactorily correlate observations based upon scales which differ so greatly from each other as many of these do. For example, the scale given by Kaemtz in his "*Meteorology*," and which is, I believe, still in use, consists of only five numbers, which however are supposed to embrace the same range of wind-force as the much better known scale of Admiral Beaufort, who employed thirteen numbers for the purpose, or the scale proposed by Wild* for use in Russia, which consists of no less than nineteen points.

The descriptions of the several wind forces, which are attached to the scales for the purpose of giving to each degree a definite and recognizable value, are not always helpful to those who attempt to reduce to a common standard observations based on more than one of them. This is probably due, to some extent at any rate, to the different conceptions which the authors of the several scales had of the extreme range of force for which provision should be made. I have elsewhere pointed out that in estimating wind-force, the experience and environment of the observer counts for a great deal,† and they, no doubt, explain why one man defines a "gale" as "a wind which is dangerous for sailing vessels," whilst another is content with "single-reefed topsails," and a third considers the term justified when applied to a wind capable of "breaking exposed shrubs." To take another example, it can only be the same variety of experience which leads the author of one scale to call a wind blowing at the rate of 45 miles per hour a "storm," justifying the use of the figure 11 upon a scale of 12 points, whilst another requires a wind velocity of 99 miles per hour to warrant the use of the same figure on a similar scale. The latter had, doubtless, had experience of winds in regions over which the air moves with a freer and more unimpeded motion, and attains higher velocities than had ever fallen within the experience of the former, and in consequence the mental estimate each had formed of what constituted a "storm" was essentially different, the one requiring for it a wind moving at more than double the speed imagined by the other.

The advantage of using everywhere the same scale for observations of wind-force, and of selecting for the purpose a scale which can be

* Report of the Proceedings of the Meteorological Congress at Vienna.

† *Quart. Jour. Roy. Met. Soc.*, Vol. xxiii. p. 24.

standardized by reference to reliable anemometrical data, has been frequently urged, and is so obvious that one wonders steps have not been taken by one or other of the international meteorological Conferences to secure its adoption. Much can be said in favour of the choice of the "Beaufort" scale for this purpose. It is already very generally employed, and especially so by seamen; it rests upon a rational basis—the speed or spread of sail of a ship under given conditions; and already there exist for the scale carefully determined velocity equivalents based upon satisfactory and sufficiently numerous anemometer values. Its general use among seamen is very important, for there is no other class to whom wind observations are more useful, or by whom they are so systematically and universally made.

As regards the use of this scale on land, it has been objected that it consists of too many numbers, and that, however desirable it may be for a seaman to discriminate between, say, a "light air" and a "light breeze" (forces 1 and 2), or between a "fresh gale" and a "strong gale" (forces 8 and 9), such fine distinctions are not required, and are indeed scarcely possible for observations made on land.

To remove this supposed disadvantage what has been called the "Land Scale" has been proposed, which is merely the Beaufort scale divided by 2.* The descriptions given to the numbers of this scale are usually the same as are attached to double the same number on the Beaufort scale; but in some cases, at least, it is clear that what is meant is not that the number on the land scale and its equivalent on the Beaufort indicate the same absolute strength of wind, but only the same *relative* strength. Thus 6 on the one scale and 12 on the other alike stand for a "hurricane"; but whilst the Beaufort hurricane should indicate a wind of, perhaps, 100 miles per hour, or even more—a wind such as might be felt at sea upon our Atlantic coasts, but fortunately never inland—the land-scale hurricane would be the same wind after it had been reduced in force by its passage over hills and dales, and its contact with trees and houses and all the other friction-producing obstructions it would meet in its path, and would in reality be a very different wind indeed. In a very early publication of the Meteorological Office reference is made to the smaller wind velocities always recorded at inland stations, and to the possibility of educing for each place a factor which should enable one to eliminate this effect of friction, and get the equivalent velocity as it would be felt on the coast, thus suggesting the idea that

* I am aware it has been stated that the numbers of the "land" scale were not obtained in this summary way, but that they were really chosen as being the square roots of the pressures per square foot exerted by the winds they are taken to represent. I have, however, never been able to find anything to support this statement, and I think it more probable that it was first suggested as the origin of the scale when it was subsequently noticed that the squares of the numbers comprising the scale roughly approximate to some of the earlier suggested scales of wind pressures, all of which are empirical and very unreliable.

it is not so much the velocity actually recorded in those districts which is required, as the velocity which might have been recorded had the physical features of the district been removed or made to correspond with those on the seaboard.

The point I wish to emphasize is that the same number on the scale employed should always indicate the same force—a wind of the velocity proper to that number whether the scale be used inland or at sea. From the Annual Reports of the Meteorological Office it appears that a wind of the velocity of 44 miles per hour, which is that due to a force of 9 on Beaufort's scale, or a "strong gale," has not once been recorded by the anemometer at the Kew Observatory for some years past, although during the same interval higher estimated forces have several times been reported in the daily weather reports as having been experienced in London. This fact shows that in London the higher numbers of the scale are often attached to winds which observers at more exposed stations would place lower down. As a matter of fact, I think the higher numbers of the Beaufort scale are rarely justified at inland stations, and the highest numbers never. What is needed, then, in the absence of an anemometer, is some means by which observers can be taught to recognise, by its visible effect upon their surroundings, the velocity of the wind, and so be able to assign to it its proper position on the scale.

For this purpose, I suggest that it should be made possible, by the publication of reliable anemometrical results day by day, for observers to ascertain what was the general velocity of the wind in their district, using that word in a somewhat comprehensive way, during strong winds and gales, the observable effects of which they had been careful to note; then by associating these effects with the known velocity, they would presently form for themselves conceptions of wind velocity which would enable them, by means of the recognised equivalents, to assign to a given wind its place upon the scale more accurately and consistently than is now generally possible.

As a matter of fact, I believe some such method as this is actually used by the best observers of wind-force. From long and careful observations they have come to regard certain effects of the wind, the character of which will of course vary in different localities, as being due to certain forces, and the number on the scale by which it is to be represented is determined accordingly. For example, when I have been comparing my estimate of wind-force with that of an experienced observer, as I always do when an opportunity offers, and I have, perhaps, thought his estimate low, he has probably justified it by some such remark as this: "The boat you see out there wouldn't be carrying the sail she does with the force you suggest"; or, "With the wind from this quarter we should have a much heavier sea," thus showing that his estimate was something better than a simple guess.

(To be continued.)

Correspondence.

To the Editor of Symons's Meteorological Magazine.

THE STUDY OF THUNDERSTORMS.

ALLOW me to welcome the proposals contained in Mr. Bonacina's letter, published in the August number of your magazine, containing suggestions for a co-operative study of thunderstorms.

Little or no progress appears to have been made in this branch of climatology since the admirable report of the "Thunderstorm Committee of the Royal Meteorological Society in 1888 and 1889." A considerable number of observers in these islands must have in their possession more or less full details of thunderstorms at their stations, which have occurred since the above report.

No doubt a discussion of these, on some definite basis to be agreed upon, would be a great help to us in further elucidating the distribution &c., of thunderstorms. Probably this suggestion may not be workable, as, no doubt, considerable monetary assistance would be necessary to help in any adequate discussion of the results. Nevertheless, I have made the proposal for what it may be worth.

At the same time, there would not appear to be any insuperable difficulty in arriving at some co-operative scheme for the observation of thunderstorms occurring in the future. I, for one, should be only too pleased to lend whatever help I can to any scheme that may hereafter be formulated.

The reasons for the neglect of this fascinating branch of atmospheric phenomena one fails to see.

SPENCER C. RUSSELL, F.R.Met.Soc.

Ashley Road, Epsom, August 26th, 1905.

"LINE SQUALL" AT SIDMOUTH.

THE HON. RALPH ABERCROMBY in "Weather," 2nd edition, pp. 252 and 253, gives a description and illustration of a "line-squall." Conditions were so similar at Sidmouth, Devon, on August 22nd at 5.45 p.m., that they may be worth putting on record.

The squall passed very quickly from W. to E., and the wreath of dark heavy clouds followed by the sheet of rain was very pronounced. The rain lasted about 45 minutes and, just as it was ceasing, a most brilliant rainbow was produced.

It is to be noted that the Weekly Weather Report for 6 p.m. on the day in question, shows a secondary depression over the Irish Sea and moving eastwards.

F. DRUCE.

65, Cadogan Square, S.W., 5th September, 1905.

HAIL STORM IN SUFFOLK.

I HAVE just measured the amount of water in my rain-gauge after a heavy hailstorm, accompanied by thunder, and it amounted to ·73 in. As by far the larger amount of the fall was hail, there being a few drops of rain at the commencement and at the finish, I should say that a great deal was lost by the large hailstones jumping out of the funnel.

Some of the biggest hailstones were the size of a common hazel nut, the majority the size of a marrowfat pea and in shape like a peg-top, streaked alternately with opaque and clear ice, having a very pretty appearance. Some of the biggest were, however, quite clear ice, and of a tabloid shape.

The fall lasted from 12.40 to 1.5 p.m. (25 minutes, not more), the hail was practically confined to 15 minutes (12.45—1 p.m.). Curiously, this is our first thunderstorm this summer, though we have had many quite close to us, notably one on 30th May with 1·30 in., consequently our record for May was *2·04*, in contrast to *1·26* at Westley, Bury St. Edmunds, which is due N. about 7 miles in a bee-line. I regret that I did not send you that month's record at once, for I think you would have altered your map of rainfall for May, 1905.

B. P. OAKES.

Hawkedon Rectory, Bury St. Edmunds, August 28th, 1905.

THUNDERSTORMS AND HEAVY RAINS DURING AUGUST.

A THUNDERSTORM of exceptional violence occurred over Devon and Somerset on the evening of August 15th, accompanied in many places by torrents of rain. Many instances of structural damage by the lightning are reported, buildings in some cases being set on fire and destroyed; a number of cattle are said to have been killed, but, happily, we have yet seen no report of serious injury to human life, though many narrow escapes are stated to have been experienced. The storm is described as having been of exceptionally long duration, with deafening thunder and extremely vivid lightning. According to an account given in the *Bristol Mercury*, the neighbourhood of Bath suffered severely, and the reports of damage sustained in that district are numerous. At Bridgwater the thunder was stated to have been "simply deafening" and the lightning very vivid. In the town, however, much more damage was done by the rain than the lightning, many streets being flooded and houses damaged by the inrush of water. In the surrounding country, the injury to crops from the same cause is said to have been extensive. From the reports we have received, the rainfall accompanying the storm appears to have been somewhat irregularly distributed, but no doubt the heaviest precipitation was experienced in a small area around the estuary of the Exe; and we print below letters from some of our observers who have kindly forwarded notes of their experiences:—

"I registered 3·98 in. of rain, which fell between 9 p.m. on August 15th and 9 a.m. on the 16th. I hear that 3 ins. was recorded at Dawlish, but I do not know the exact amount; over two inches fell at Kenton and Mamhead. I should like to have a photo. of the road outside my gate to show the mischief done."—C. F. BENTHALL, *Cofton Vicarage, Starcross, August 18th, 1905.*

"I send you the amount of rain registered here on Wednesday morning, 16th—2·89 in. It fell in 6 hours during a thunderstorm, and is the largest quantity of rain I have measured here in 24 hours." —D. C. STEWART, *Nidderdale, Exmouth, August 17th, 1905.*

"We had such an exceptional thunderstorm last night that I think you may be glad to hear a few particulars of it. At 8.40 p.m. on Tuesday, 15th August, a flash of lightning, thunder, and a torrent of rain came with a rush after a hot and sultry day. From that hour till about 4 a.m. on Wednesday there was no stop. This morning 3·38 inches of rain was measured, and to-day has been dry. The lightning and thunder were often simultaneous. At other times I counted 4, 5, and up to 20 between. The water-courses are scoured out and a little island has formed in the river, opposite one of the town surface-water drains, from the rubble washed down the hills. I do not hear of any death from lightning. Fire-struck objects must have been extinguished instantly by the rain. The streams were so low that there is no great flood, even with the downpour. I have never seen or heard anything so extreme in Devonshire, and all to whom I have spoken say the same."—L. J. B. G., *Charlton House, Dawlish, August 16th, 1905.*

Another remarkable fall of rain occurring during the month was that of August 24th and 25th, which affected almost the whole of Ireland, especially the eastern and central portions of the country. Dublin and district appear to have been particularly severely visited, and falls ranging from three to five inches for the two days are reported from stations in the neighbourhood. By far the larger part of this quantity fell on the 25th. The downpour, which is stated to have lasted without intermission for some 40 hours, culminated in the flooding of several small rivers on the eastern coast, occasioning much damage in many places. The most disastrous flood occurred at Bray, a fashionable health resort, 13 miles south-east of Dublin, well known for the picturesque scenery to be found in its neighbourhood. Here widespread destruction was wrought in a part of the town known as Little Bray by a sudden rise in the Dargle river, which inundated the streets making them impassable. The inmates of the houses had to be rescued by boats, and hundreds were rendered homeless. One man lost his life, and many other persons were rescued only by the greatest exertions. It is unnecessary for us to say more concerning the exciting scenes which were witnessed, as they have already been vividly described by the newspaper press all over the country. A

glance at the Daily Weather Report for the 26th of August shows very distinctly the track of the depression, which must be held reponsible for the deluge. At 6 p.m. on the 25th the centre of the disturbance lay outside the Bristol Channel, and moving northward up the St. George's Channel, was immediately over Dublin at 8 a.m. on the 26th; here it changed its course to eastward across the Irish Sea, and ultimately crossed England in a north-easterly direction. Below is given a Table which, though by no means complete, will give some idea of the intensity of the rainfall over the district most severely affected. The Table includes all instances where a fall of 2 inches or more was measured in the two days.

County.	Station.	24th. in.	25th. in.	Total. in.
Cork	Cork, Wellesley Terrace	1·75	·36	2·11
Waterford...	Waterford, Brook Lodge.....	·89	1·55	2·44
,,	Glenam [Clonmel]	1·24	·80	2·04
Tipperary...	Ballingarry, Gurteen	1·07	1·74	2·81
Wexford.....	Templeudigan, Ballindoney.....	·62	1·57	2·19
,,	Gorey, Courtown	·56	2·46	3·02
Wicklow	Greystones, Knockdolian	·82	3·35	4·17
,,	Sugar Loaf, Rocky Valley	·50	5·50	6·00
,,	Bray, Fassaroe	·64	4·45	5·09
Carlow	Carlow, Brownes Hill	·56	2·12	2·68
Queen's County	Mountrath, Ballyfin.....	1·07	1·48	2·55
Dublin..	Ballybrack, Streamville	·55	3·20	3·75
,,	Killiney	·58	3·06	3·64
,,	Stillorgan.....	·68	3·22	3·90
,,	Kingstown, People's Park	·52	3·15	3·67
,,	,, Board of Works ...	·52	3·17	3·69
,,	Rathmines, Leinster Road	·50	3·46	3·96
,,	Dublin, Fitzwilliam Square	·51	3·44	3·95
,,	,, Trinity College.....	·49	3·30	3·79
,,	,, Leeson Park.....	·59	3·74	4·33
,,	,, Phœnix Park	...	3·35	...
,,	,, Glasnevin	...	3·58	...
,,	Malahide.....	...	3·11	...
Meath.....	Oldcastle, Killeagh	·68	2·65	3·33
,,	Moynalty, Westland.....	·55	2·88	3·43
Westmeath...	Athlone, Twyford.....	·80	1·65	2·45
,,	Moate, Coolatore	·81	2·05	2·86
,,	Mullingar, Belvedere..	·65	2·65	3·30
Louth	Drogheda, St. James'.....	·64	4·01	4·65
Longford.....	Ballymahon, New Castle.....	·65	1·81	2·46
Galway	Ballinasloe	·84	1·45	2·29
,,	Woodlawn	·73	1·68	2·41
Down.....	Warrenpoint, Summer Hill ...	·73	1·40	2·13
,,	Seaforde	·00	2·29	2·29
,,	Banbridge, Milltown	·22	2·25	2·47
Antrim.....	Belfast, Springfield	·13	2·22	2·35
Tyrone	Stewartstown, The Square	·35	2·18	2·53

The Table shows that the greatest intensity occurred over an area embracing the southern part of the county of Dublin, and the northern part of Wicklow; and the record of 6·00 ins. at Rocky Valley, between Great Sugar Loaf and Carrigoona, suggests that possibly an even heavier fall took place farther in the mountains.

REVIEW.

Meteorology: or, Weather Explained. By J. G. McPherson, Ph.D., F.R.S.E. London: T. C. & E. C. Jack, 1905. Size 7 × 4½, pp. 126.

The title is misleading, for the little book which bears it does not explain the weather, nor does it show any extensive knowledge of the literature of meteorology. It is a chatty, garrulous book, with many pleasant reminiscences of personal experiences by a careful and watchful observer, but it makes no attempt to deal systematically with meteorology or with weather. The essential part is a very useful summary of Dr. John Aitken's excellent work on the phenomena of dew and on the functions of atmospheric dust. Dr. Aitken's discussion of cyclonic and anti-cyclonic movements, based on experiments, is referred to, but too briefly to be of use to the reader, and the contributions of the myriad of meteorological workers in all countries are passed over unnoticed, or barely mentioned. The necessary limits of space in a shilling book, of course, excuses many omissions.

We dissent *in toto* from the first paragraph of the chapter headed "Rain Phenomena," which runs:—

"The soft rain on a genial evening, or the heavy thunder-showers on a broiling day, are too well-known to be written about. Sometimes rain is earnestly wished for, and at other times it is dreaded, according to the season, seed-time or harvest. Some years, like 1826, are very deficient in rainfall, when the corn is stunted and everything is being burnt up; other years, like 1903, there is an over-supply, causing great damage to agriculture. The year 1903 will long be remembered for its continuous rainfall; it is the record year; no year comes near it for the total rainfall all over the kingdom."

Our annual labour is indeed in vain if the phenomena of rainfall are too well-known to be written about. The best example of a year of deficient rainfall, to the best of our knowledge, is 1887. Although 1903 was a very wet year, we found, as the result of six strenuous months spent in collating the records of 4,000 stations and comparing these with the records of other wet years, that 1872 was wetter, and 1852 only a little less wet. The details are fully set forth in "*British Rainfall*, 1903."

METEOROLOGICAL OBSERVATIONS DURING THE SOLAR ECLIPSE.

Mr. W. L. Fox has kindly forwarded particulars of the records of the self-registering instruments at the Falmouth Observatory on August 30th. The thermograph showed a slight depression at 12.30 p.m., and the temperature continued to fall very slightly till 1.15 p.m., well after the maximum phase. The barometer rose gradually and steadily throughout the day, the rise being slightly

more pronounced between 1 and 2 p.m., but there were no irregularities in the trace. The magnetic curves were somewhat unsteady, but show no special characteristics during the time of the eclipse.

Mr. C. P. Chambers, of Broughton-in-Furness, has favoured us with a diagram, showing the movements of the barometer and thermometer during the eclipse. No apparent effect is evident in the barometer record, but a decline of temperature is distinctly shown, the thermometer falling from nearly 60° at noon to 56° at 1.15 p.m. A recovery then took place, and at 3 p.m. the thermometer touched 60°, which was the maximum for the day.

A STRANGE SPECTACLE.

THE NEW ZEALAND PRESS furnishes particulars of a remarkable sight recently witnessed at various places on those islands, and we take the liberty of reprinting a portion of the monthly report, issued from the Meteorological Office at Wellington, which contains a description of the spectacle, with the impressions of several eye-witnesses :—

"On the 9th June, about three-quarters of an hour after sunset, a most remarkable phenomenon was witnessed for about twenty minutes in the western sky at places so far apart as Auckland, New Plymouth, Halcombe, Otaki, Nelson, and Hokitika. It must have been over five hundred miles away on the Tasman Sea. It may be described as a "meteoric cloud," and its appearance that of clear silver-coloured lightning. It was possibly caused by a meteor entering our atmosphere in an eastward and almost horizontal direction, and becoming luminous through combustion and disintegration into meteoric dust caused by the friction of its rapid passage through the atmosphere. At places it appeared like a long streak of luminous cloud, which gradually assumed a "Z" shape. At New Plymouth our observer, Mr. W. G. Palmer, first observed a luminous head, and afterwards another ball of light also appeared lower down. This latter shape it kept for about ten minutes, and then finally dissolved. Its azimuth is given near Auckland as about 358° ; at New Plymouth, 310°, with an altitude of 35° ; at Otaki, W.N.W., with an altitude of about 12° ; at Nelson, the azimuth 292°, and altitude 30°. Mr. A. D. MacFarlane, Meteorological Observer at Hokitika, writes : "The peculiar body of meteor which was noticed at Nelson and elsewhere was also observed here. It was noticed in the north-western heavens by a number of people, and for a time appeared to approach rapidly, then gradually faded away. It had the appearance of a large luminous body, with a long wavy ribbon-like tail." Mr. L. A. MacDonald, of Halcombe, reported : "A most extraordinary aerolite was seen in the western sky on the evening of the 9th. It traversed a zigzag course, and left a brilliant trail against the sky about 30° long ; in shape it was not unlike a streak of forked lightning. It preserved its position and luminosity for more than twenty minutes, then it became more diffused and fainter, but it retained a glow equal to that of the zodiacal light for ten minutes longer. While the trail was at its greatest brightness it far outshone the moon, which was at the time entering into her first quarter.

D. C. BATES, F.R.Met. Soc.

Meteorological Office, Wellington, 17th July, 1905."

EIGHT MONTHS' RAINFALL OF 1905.

Aggregate of Rainfall for January—August, 1905.

Stations.	Total Rain.	Per cent. of Aver.	Stations.	Total Rain.	Per cent. of Aver.	Stations.	Total Rain.	Per cent. of Aver.
	in.			in.			in.	
London	15·65	101	Bolton	24·98	99	Braemar	20·72	96
Tenterden	17·42	108	Wetherby.....	14·41	86	Aberdeen	17·25	87
Hartley Wintney	15·70	98	Arncliffe	30·47	83	Cawdor	19·27	105
Hitchin	16·57	110	Hull	13·39	81	Invergarry ...	35·16	108
Winslow	14·48	87	Newcastle.....	11·51	66	Bendamph ...	50·45	102
Westley.....	15·50	99	Seathwaite ...	71·73	92	Dunrobin	20·15	107
Brundall	13·70	91	Cardiff, Ely ...	21·79	86	Killarney ...	29·72	85
Alderbury	18·39	107	Haverfordwest	26·30	96	Waterford ...	24·66	103
Winterbourne ...	18·18	81	Gogerddan ...	29·51	112	Broadford.....	21·56	103
Torquay	17·32	84	Llandudno ...	16·39	93	Carlow	20·83	97
Polapit Tamar ...	21·23	98	Cargen	23·25	89	Dublin	18·05	103
Bath	15·67	83	Lilliesleaf.....	17·61	86	Mullingar.....	22·82	99
Stroud, Upfield...	18·69	101	Colmonell	23·16	89	Ballinasloe ...	19·92	86
Woolstaston	18·95	94	Glasgow	18·20	82	Clifden	40·23	83
Bromsgrove	15·33	99	Inveraray	42·22	115	Crossmolina ...	27·51	92
Boston	14·16	98	Islay, Eallabus	30·88	115	Seaforde	23·13	97
Hodsock Priory..	11·54	74	Mull	32·98	100	Londonderry..	23·62	96
Derby.....	11·90	72	Dundee	13·55	74	Omagh	24·30	104

Although the rainfall of August has had the effect of increasing the percentages all over the kingdom, and raising the average percentage from 87 at the end of July to 94 in the present table, the rainfall for Great Britain, at least, was of so general a character that the relative distribution is little changed.

Practically all the country south of the Grampians has a rainfall well below the average of the eight months, the only exceptions being the relatively wet area in the neighbourhood of London extending into the home counties, and an isolated instance in Wales. The only well defined area with a rainfall in excess of the average is that part of Scotland cut off by the Caledonian Canal. All stations in this region had more than the normal fall. Inveraray was still, save Seathwaite, both absolutely and, jointly with Eallabus, relatively the wettest station in the table, Newcastle with two thirds of its normal fall being the driest. The valley of the Trent is also shown to be remarkably dry. Ireland, which at the end of July was represented as having a deficiency of about 15 per cent. for the country, has now advanced to within 3 per cent. of the average fall, due to the abnormal rains attending the passage of a depression on August 24th and 25th. The eastern coast was in this instance most affected by the disturbance, and certain stations show a remarkable increase, notably Dublin, which with a deficit of 24 per cent. at the end of July, has now moved forward to an excess of 3 per cent. The south-west of the country, usually in the track of such disturbances, was on this occasion well to the west, and the fall was slight compared with the deluge visiting the Dublin district.

RAINFALL AND TEMPERATURE, AUGUST, 1905.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables in *British Rainfall* to which each station belongs.]	RAINFALL. Total Fall.	Diff. from average, 1870-99.	Greatest in 24 hours. Depth	Date.	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Date.	Min. Deg.	Date.	No. of Nights below 32°. Shade	Grass
		inches	inches.	in.								
I.	London (Camden Square) ...	2·24	— ·09	·83	28	16	78·1	15	45·4	24	0	0
II.	Tenterden ...	2·47	+ ·10	·68	28	15	75·3	13	44·0	24	0	0
,,	Hartley Wintney ...	2·34	+ ·25	·57	27	17	75·0	4, 11*a*	45·0	15*b*	0	0
III.	Hitchin ...	3·25	+ ·99	·96	28	18	74·0	14	43·0	16	0	...
,,	Winslow (Addington) ...	3·03	+ ·50	·85	28	18	75·0	14, 15	43·0	17, 24	0	0
IV.	Bury St. Edmunds (Westley)	2·21	— ·19	·35	26	16	78·5	13	45·0	17	0	...
,,	Brundall ...	2·27	+ ·08	·64	29	18	77·2	21	46·0	21	0	0
V.	Alderbury ...	3·06	+ ·71	·68	3	20	84·0	15	30·0	23	1	...
,,	Winterbourne Steepleton ...	4·15	+ ·97	1·17	2	18	74·2	15	40·7	24	0	0
,,	Torquay (Cary Green) ...	3·16	+ ·25	·77	15	20	69·8	14	50·2	14	0	0
,,	Polapit Tamar [Launceston]	5·32	+ 2·13	·66	27	21	73·2	15	41·0	24	0	0
,,	Bath ...	3·98	+ 1·02	·70	25	20	74·5	15	42·2	24	0	0
VI.	Stroud (Upfield) ...	4·43	+ 1·60	·80	28	19	76·0	15, 21	48·0	23	0	..
,,	Church Stretton (Woolstaston)	4·25	+ 1·01	·87	28	19	70·0	15	43·0	31	0	...
,,	Bromsgrove (Stoke Reformatory)	5·13	+ 2·67	·80	7	19	71·0	...	39·0	...	0	...
VII.	Boston ...	2·78	+ ·53	·72	28	12	75·0	8	46·0	2	0	...
,,	Worksop (Hodsock Priory).	2·43	+ ·12	·63	25	16	74·5	15	38·7	17	0	1
,,	Derby (Midland Railway)...	2·93	+ ·51	·38	17	20	76·0	14	45·0	16, 23	0	...
VIII.	Bolton (The Park) ...	5·64	+ 1·28	1·14	25	22	73·6	15	44·5	31	0	0
IX.	Wetherby (Ribston Hall) ...	3·88	+ 1·29	·72	26	17	...	...	...	...	...	...
,,	Arncliffe Vicarage ...	5·36	— ·07	·90	19	19	...	...	...	...	...	...
,,	Hull (Pearson Park) ...	2·73	— ·08	·43	25	21	74·0	14, 21	45·0	25	0	0
X.	Newcastle (Town Moor) ...	2·57	— ·57	·57	26	24	...	...	...	...	...	..
,,	Borrowdale (Seathwaite) ...	9·77	— 1·46	1·77	17	20	72·9	15	40·4	31	0	...
XI.	Cardiff (Ely) ...	4·33	— ·19	·50	2	21	...	...	...	...	...	...
,,	Haverfordwest (High St.)...	5·47	+ 1·43	·85	27	21	72·8	15	41·6	14	0	0
,,	Aberystwyth (Gogerddan)..	6·99	+ 2·39	2·15	22	14	79·0	17	40·0	12*c*	0	...
,,	Llandudno ...	2·81	+ ·05	·80	22	16	72·0	15	46·8	14	0	...
XII.	Cargen [Dumfries] ...	3·84	— ·26	·58	17	14	74·0	15	40·0	31	0	...
,,	Lilliesleaf (Riddell) ...	4·62	+ 1·20	·80	25	20	69·0	31	30·0	4	1	12
XIII.	Edinburgh (Royal Observy.)	2·46	...	·43	28	18	67·8	4	42·4	31	0	0
XIV.	Colmonell ...	5·00	+ 1·02	·90	26	20	77·0	15	39·0	30	0	...
XV.	Tighnabruaich ...	6·59	+ 1·46	1·38	4	20	63·0	14	42·0	23, 30	0	0
,,	Mull (Quinish) ...	4·20	— ·64	·96	17	19	...	...	...	...	...	...
XVI.	Dundee (Eastern Necropolis)	3·45	+ ·37	·75	3	17	70·6	8, 13	38·2	31	0	..
XVII.	Braemar ...	4·02	+ ·19	·70	3	22	64·9	13	38·8	9	0	...
,,	Aberdeen (Cranford) ...	3·64	+ ·42	1·00	3	22	68·0	7, 12	43·0	15, 20	0	...
,,	Cawdor (Budgate)	3·05	— ·02	·62	4	24	...	...	...	...	...	...
XVIII.	Invergarry ...	2·98	— 1·21	·45	9	13	...	...	...	...	...	...
,,	Bendamph ...	6 01	— ·90	1·02	17	24	...	...	...	...	...	...
XIX.	Dunrobin Castle ...	3·15	+ ·50	·90	3	19	64·5	8	45·5	31	0	...
,,	Castletown ...	4·24	...	·58	17	27	67·0	22	40·0	3*d*	0	...
XX.	Killarney ...	5·09	+ ·17	·61	23	22	71·5	15	43·5	8	0	...
,,	Waterford (Brook Lodge)...	5·54	+ 1·83	1·55	25	18	70·0	7, 16	40·0	22	0	...
,,	Broadford (Hurdlestown) ...	4·27	+ ·48	·87	27	22	72·0	14	44·0	21	0	...
XXI.	Carlow (Browne's Hill) ...	6·05	+ 2·54	2·12	25	19	...	...	...	...	...	...
,,	Dublin (Fitz William Square)	7·02	+ 4·00	3·44	25	22	70·6	16	46·0	31	0	0
XXII.	Ballinasloe	5·72	+ 1·76	1·45	25	20	74·2	16	40·0	2	0	...
,,	Clifden (Kylemore House)..	7·15	— ·75	1·00	31	22	...	...	...	...	...	...
XXIII.	Seaforde ...	7·82	+ 4·30	2·29	25	21	72·0	9, 15	44·0	23	0	0
,,	Londonderry (Creggan Res.)	4·46	+ ·52	·77	25	24	...	...	...	...	...	...
,,	Omagh (Edenfel) ...	4·86	+ ·83	1·05	25	23	72 0	16	41·0	7	0	0

+ Shows that the fall was above the average; — that it was below it.
a and 12. *b* and 16, 17. *c* and 13, 23. *d* and 16, 23.

SUPPLEMENTARY RAINFALL, AUGUST, 1905.

Div.	STATION.	Rain. inches	Div.	STATION.	Rain. inches
II.	Dorking, Abinger Hall	3·45	XI.	New Radnor, Ednol	6·84
,,	Ramsgate, West Cliff.....	1·53	,,	Rhayader, Nantgwillt ...	7·86
,,	Hailsham	3·37	,,	Lake Vyrnwy	6·65
,,	Crowborough	3·30	,,	Ruthin, Plâs Drâw.....	4·86
,,	Osborne.....	2·25	,,	Criccieth, Talarvor.....	4·88
,,	Emsworth, Redlands..... ...	2·87	,,	Anglesey, Lligwy	3·26
,,	Alton, Ashdell	3·49	,,	Douglas, Woodville	5·50
,,	Newbury, Welford Park ...	3·55	XII.	Stoneykirk, Ardwell House	4·99
III.	Harrow Weald	2·54	,,	Dalry, Old Garroch	5·27
,,	Oxford, Magdalen College..	2·91	,,	Langholm, Drove Road.....	5·79
,,	Banbury, Bloxham Grove...	4·84	,,	Moniaive, Maxwelton House	4·53
,,	Pitsford, Sedgebrook.....	3·02	XIII.	N. Esk Reservoir [Penicuick]	3·60
,,	Huntingdon, Brampton.....	3·15	XIV.	Maybole, Knockdon Farm..	4·43
,,	Wisbech, Bank House	1·76	,,	Glasgow, Queen's Park	3·60
IV.	Southend	1·73	,,	Campbeltown, Redknowe...	4·86
,,	Colchester, Lexden.....	1·50	XV.	Inveraray, Newtown.....	6·22
,,	Saffron Waldon, Newport...	2·21	,,	Ballachulish House.....	7·53
,,	Rendlesham Hall	1·58	,,	Islay, Eallabus	5·65
,,	Swaffham	2·84	XVI.	Dollar	3·33
,,	Blakeney	2·12	,,	Loch Leven Sluices	4·03
V.	Bishops Cannings	6·05	,,	Balquhidder, Stronvar	7·34
,,	Ashburton, Druid House ...	4·73	,,	Coupar Angus Station	3·33
,,	Okehampton, Oaklands.....	6·05	,,	Blair Atholl.....	3·43
,,	Hartland Abbey	3·64	,,	Montrose, Sunnyside.....	3·32
,,	Lynmouth, Rock House ...	4·99	XVII.	Alford, Lynturk Manse ...	4·98
,,	Probus, Lamellyn	4·66	,,	Keith..... ..	3·76
,,	Wellington, The Avenue ...	4·57	XVIII.	N. Uist, Lochmaddy	3·67
,,	North Cadbury Rectory ..	4·00	,,	Aviemore, Alvey Manse ...	3·37
VI.	Clifton, Pembroke Road ...	3·89	,,	Loch Ness, Drumnadrochit.	2·58
,,	Moreton-in-Marsh, Longboro'	5·26	,,	Glencarron Lodge	8·01
,,	Ross, The Graig	3·65	,,	Fearn, Lower Pitkerrie.....	2·99
,,	Shifnal, Hatton Grange.....	4·80	XIX.	Invershin	3·30
,,	Wem Rectory	4·20	,,	Altnaharra	3·22
,,	Cheadle, The Heath House.	5·04	,,	Bettyhill	3·95
,,	Coventry, Kingswood	4·23	,,	Watten	2·78
VII.	Market Overton	2·95	XX.	Cork, Wellesley Terrace ...	6·77
,,	Market Rasen	3·32	,,	Darrynane Abbey	5·18
,,	Bawtry, Hesley Hall.....	2·50	,,	Glenam [Clonmel]	5·61
VIII.	Neston, Hinderton.....	3·88	,,	Ballingarry, Gurteen	5·73
,,	Southport, Hesketh Park...	3·40	,,	Miltown Malbay.....	4·19
,,	Chatburn, Middlewood	4·88	XXI.	Gorey, Courtown House ...	5·57
,,	Cartmel, Flookburgh	5·77	,,	Moynalty, Westland	7·66
IX.	Langsett Moor, Up. Midhope	4·24	,,	Athlone, Twyford	5·48
,,	Scalby, Silverdale	3·20	,,	Mullingar, Belvedere.....	6·74
,,	Ingleby Greenhow	3·41	XXII.	Woodlawn	7·20
,,	Middleton, Mickleton	3·58	,,	Westport, Murrisk Abbey..	4·73
X.	Beltingham	...	,,	Crossmolina, Enniscoe	4·41
,,	Font Reservoir, Fallowlees.	4·87	,,	Collooney, Markree Obsy...	5·34
,,	Ilderton, Lilburn Cottage...	3·44	XXIII.	Enniskillen, Portora	...
,,	Keswick, The Bank	4·65	,,	Warrenpoint	7·63
XI.	Llanfrechfa Grange.....	5·15	,,	Banbridge, Milltown	5·99
,,	Treherbert, Tyn-y-waun ...	10·42	,,	Belfast, Springfield	6·64
,,	Carmarthen, Friary	5·58	,,	Bushmills, Dundarave	4·90
,,	Castle Malgwyn	6·06	,,	Stewartstown	7·44
,,	Plynlimon.....	11·10	,,	Killybegs	5·02
,,	Tallyllyn	1·80	,,	Horn Head	4·88

METEOROLOGICAL NOTES ON AUGUST, 1905.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Temp. for Temperature; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND AND WALES.

LONDON, CAMDEN SQUARE.—Rather cool and cloudy. On no day did the max. temp. reach 80°, but the mean was 61°·9, or only 0°·2 below the average. Sunshine was deficient, the total duration being only 148·4* hours. A feature of the month was the number of beautiful evenings, often following stormy days. Strong winds about the middle. A short TS occurred on 5th and thundery conditions prevailed from 27th to 29th. Duration of R 40·1 hours.

ABINGER HALL.—The first and last portions were stormy, but a wonderful spell of fine weather in the middle enabled farmers to get in the harvest in good condition. Corn crops were fairly good. Sharp TSS on 22nd and 28th. Frost on 23rd.

TENTERDEN.—Rather a cold month, with showers in the first week and a good deal of R in the last. Duration of sunshine 193·3† hours.

CROWBOROUGH.—Cool and pleasant, with a considerable amount of sunshine. The R, which fell mainly in the first and last weeks, was above the average, but there was still a deficiency of 1·52 in. from January 1st. Mean temp. 58°·7.

HARTLEY WINTNEY.—The first week was wild and stormy, with TSS and sunless days. The weather improved from 7th to 18th, becoming hotter and drier. The last week was wet and stormy, with distant TSS. Ozone on 23 days; mean 2·7. Harvest and crops good.

WISBECH.—Although it was cloudy the eclipse was seen at about 0.40 p.m., the sun being then a crescent. As the darkness soon after came on, birds became greatly excited, swallows, swifts and other small birds flying wildly about till 1.15 p.m., when they seemed to settle.

BURY ST. EDMUNDS.—Warm and dry with high max. temp. Very favourable for harvest till 26th; then good R, which was much wanted for roots.

BISHOPS CANNINGS.—Harvest began early but was greatly hindered; the greater part was, however, carried by the end of the month. On 15th 1·52 in. of R fell, nearly all between 8 and 10 p.m. with T.

TORQUAY.—Duration of sunshine 188·9* hours, or 18·4 hours below the average. Mean temp. 60°·3, or 1°·3 below the average. Mean amount of ozone 4·7.

OKEHAMPTON.—Very wet, with an exceptional fall of 1·72 in. on 15th, all coming down in about 2 hours during a TS.

WELLINGTON.—A great contrast to July, being unsettled, wet and cool almost throughout. R about 1·75 in. above the normal. The TS on 15th and 16th was very severe. The temp. reached 70° on 6 days only.

NORTH CADBURY.—Ranking, as regards temp., with the miserable Augusts of 1902 and 1903, the max. temp. being very low, but nights not cold. A very bad gale, lasting 24 hours, ended at 7 p.m. on 4th. T on 5th and T and L on 1st, 15th, 27th and 29th, that on 29th being preceded by terrific inky blackness in the N. although the storm was not severe. The eclipse was well seen.

ROSS.—Unsettled and showery month, but very fine from 11th to 16th. Harvest was somewhat hindered. Two slight TSS.

WORKSOP.—Showery, with no hot weather. The R for the last 12 months was only 15·25 in., or 39 per cent. below the average.

BOLTON.—Mean temp. 56°·1, being 1°·2 below the average; 60° was reached on only two days. Duration of sunshine 115·2* hours, or 3·1 hours below the average. TS on 17th, which was responsible for the death of a man in the neighbourhood; some trees were also damaged. T and L on 28th and T on 9th.

SOUTHPORT.—Dull, with low and unsteady bar., but in nearly all other respects fairly normal. Mean temp. 0°·7 below the average. Duration of sunshine 26* hours below the average, and R ·39 in. under the average. Duration of R 44·4 hours. Underground water level unprecedentedly low.

LILBURN.—The R was abundant and most beneficial to growing crops and pastures, but it retarded harvest operations. TSS almost absent. Temp. normal.

LLANFRECHFA GRANGE.—The R on the first 6 days was very acceptable as scarcity of water was anticipated. Very warm in the early part. Harvest was early and well housed.

HAVERFORDWEST.—A wet and stormy month; fine and warm from 10th to 16th, broken weather afterwards. Crops were good, but much damaged by the wet. Duration of sunshine 154·0* hours.

GOGERDDAN.—Rather wet and very cold, with frequent gales from E., N.W. and W. R was badly needed and did good to root crops but afterwards damaged harvest crops.

DOUGLAS.—Following the dry and often warm weather from May to July, this month came in with strong winds and distinctly cool conditions. On 17th the weather completely broke up, with violent gales and heavy R to 26th, during which period 3·85 in. fell. Then gloomy, wet and cold to 30th.

SCOTLAND.

CARGEN.—Warm and genial, harvest operations being very general during the latter half. T on 3rd and 9th, L on 18th. The eclipse was seen very well.

LILLIESLEAF.—There were many very heavy and continuous showers; hay and corn suffered much and could not be got in. Silent TS on 25th.

INVERARAY.—Unsettled and showery throughout, with hardly any warm days.

COUPAR ANGUS.—The R was practically normal and the mean temp. 56°·9 or 1°·2 above the average, this being due to warm nights.

ABERDEEN.—Wet, with little sunshine and light winds. Good crops and harvesting going on, but trying weather.

DRUMNADROCHIT.—R ·36 in. below, and rainy days 5 above, the average of 19 years. On the whole cold and unseasonable. Thick fog all day on 27th.

CASTLETOWN.—Sunless, cold and damp throughout. Farmers were just beginning to cut barley at the end.

IRELAND.

CORK.—The R was the greatest since 1892, when it reached 8·50 in. Remarkably low temp., the mean being 55°·5. During the eclipse the temp. fell 4° during the period when it generally rises 2°.

DARRYNANE ABBEY.—A bad month with a few very fine days. R 13 per cent. over the average.

WATERFORD.—From 24th to 27th 3·05 in. of R fell with some H. T on 3rd and 4th. Fog on 14th and 17th. Mean temp. 57°·0. The eclipse was seen well.

BALLINGARRY.—Continuous R for 36 hours from 8 p.m. on 24th, yielding 2·81 in.

DUBLIN.—Changeable and cool and notable for the excessive R. Nearly half the total fell on 25th, when 3·44 in. was measured. The mean temp. was 58°·5, and the prevailing winds were N.W. and W.S.W.

BANBRIDGE.—R 2·79 in. above the average of 40 years. On 25th 2·25 in. fell, the greatest fall since October 12th, 1865.

BELFAST.—The wettest month since October, 1903, owing to the R on 25th and 26th, when 3·00 in. fell, making the wettest spell since August, 1883. Fortunately there was comparatively little damage by flooding.

OMAGH.—Except for a fine spell in the second week the month was rainy and unsettled and unfavourable for harvest operations. The most noteworthy circumstance was the heavy general R on 26th, but the moisture coming from the S. and E. the clouds had deposited their extraordinary burden before reaching here and only 1·05 in. fell.

* Campbell-Stokes. † Jordan.

Climatological Table for the British Empire, March, 1905.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	60·9	22	27·0	4	52·8	38·5	40·9	87	102·8	21·1	3·00	21	7·1
Malta	...	...	...	...	...	...	...	...	...	...	...	...	...
Lagos	93·0	9*a*	72·0	2	90·0	77·7	75·3	72	146·0	66·5	1·48	9	5·5
Cape Town	95·4	18	52·6	5	79·0	60·6	58·2	70	...	...	1·00	5	3·8
Durban, Natal	88·7	12	58·7	18*b*	80·1	64·3	...	...	144·4	...	4·07	15	4·7
Johannesburg	80·4	13	42·0	18	69·8	52·6	53·7	86	142·2	42·2	3·42	14	5·1
Mauritius	86·7	1, 6	64·7	27	83·4	72·4	72·2	85	153·2	58·9	14·98	27	8·2
Calcutta	94·7	30	61·4	21	86·2	67·4	67·0	74	150·9	57·5	3·48	9	5·3
Bombay	86·7	15	62·0	2	82·8	70·4	65·6	71	134·4	54·1	·00	0	2·3
Madras	96·9	31	68·8	6	90·4	75·2	71·5	73	150·0	65·8	·85	3	3·3
Kodaikanal	73·3	13	45·9	6	67·6	51·1	47·4	67	138·4	32·1	2·34	11	3·9
Colombo, Ceylon	93·7	6	72·0	5	89·3	76·6	76·9	75	154·0	67·0	1·27	4	3·6
Hongkong	77·0	14	47·2	5	61·8	56·3	55·9	88	125·1	...	11·49	20	9·6
Melbourne	96·1	19	44·0	13	73·6	52·4	49·0	63	143·0	33·7	·96	5	4·6
Adelaide	101·6	18	46·7	11	79·3	56·0	49·0	54	156·0	43·2	·15	4	3·2
Coolgardie	99·6	7	44·0	20	85·1	58·3	49·2	45	159·0	39·9	·17	2	2·4
Sydney	89·9	10	59·4	14	75·2	63·8	61·3	75	126·0	50·1	8·98	19	5·6
Wellington	73·2	13	45·8	19	65·9	54·8	52·7	76	123·0	42·0	5·39	14	6·3
Auckland	78·0	3	53·0	9	71·1	57·9	54·0	69	142·0	43·0	2·54	6	3·8
Jamaica, Negril Point	85·0	14	64·9	4	83·6	68·2	68·3	76	...	...	3·73	10	...
Trinidad	90·0	1	63·0	1*c*	86·4	66·8	73·7	87	163·0	60·0	3·74	12	...
Grenada	85·6	31	68·4	26	82·2	71·8	70·1	78	150·0	...	4·70	17	3·9
Toronto	64·0	29	5·7	5	38·7	22·5	23·2	79	72·3	1·0	·51	7	5·5
Fredericton	57·7	30	-18·5	15	37·9	12·6	13·5	54	...	...	1·15	6	4·4
Winnipeg	57·7	26	-19·5	12	32·9	14·8	...	...	...	...	1·78	11	6·2
Victoria, B.C.	68·0	9	31·3	29	53·1	42·6	...	...	...	...	1·39	18	7·0
Dawson	41·6	28	-17·6	16	21·3	2·2	...	...	...	...	·40	2	...
Trinidad January ...	88·0	17	61·0	31	85·0	66·3	68·5	79	158·0	57·0	2·41	10	...
Trinidad February ...	90·0	25,26	62·0	4	85·6	65·3	67·2	74	165·0	58·0	·59	8	...

a and 13, 14. *b* and 19. *c* and 19, 20.

Mauritius.—Mean temp. 0°·1 below, dew point 1°·7 above, and R 5·82 in. above, averages. Mean hourly velocity of wind 8·8 miles, or 1·6 below average; extremes, 30·1 on 30th and 0·0 on 25th; mean direction E.S.E. L and T 1st to 4th, 6th to 8th, 13th, 14th, 19th and 22nd; L on 5th, 15th and 31st; T on 10th and 12th.

MADRAS.—Temperature was higher than usual. TSS on 3 days; distant TSS on 2 other days, and distant L on 4 other days. Bright sunshine on 227·6 hours.

KODAIKANAL.—Bright sunshine on 222 hours.

HONGKONG.—Mean temp. of air 58°·9. R 8·85 in. above 20 years' average. Mean direction of wind E.; mean hourly velocity 17·9 miles. Bright sunshine 31·1 hours.

Adelaide.—Mean temp. of air 67°·6 or 2°·6 below, R ·91 in. below, averages.

Sydney.—Mean temp. of air 0°·2 above, humidity 0·5 below, and R 3·81 in. above, averages.

Wellington.—Mean temp. of air 0°·2 below, and R 2·23 in. above, averages.

Auckland.—Mean temp. of air above average, and R 1·00 in. below average.